



Sustainable Permanent Pasture-based Farrow-to-Finish Outdoor Hog Enterprise Budget

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Introduction

Outdoor hog producers face both opportunities and challenges. Economic opportunities include the growing number of pork buyers who are looking for niche products produced locally and produced in certain ways. Economic challenges include higher costs of production and achieving a sufficient size of enterprise to be viable. Environmental challenges include preventing the nutrients produced by the hogs from polluting surface and ground waters.

Hog manure and urine contain large amounts of nitrogen, phosphorus and potassium. Phosphorus can build up to high levels in the soil populated by hogs. If not properly managed, phosphorus and nitrogen can contaminate surface and ground waters. Phosphorus contamination can occur through soil erosion that carries this nutrient to surface waters. If the level of phosphorus in soil reaches very high levels, a portion can become soluble, increasing the potential for leaching into ground water. Nitrogen is a more soluble nutrient and has the potential for entering both surface and ground waters. Maintaining pasture cover can greatly reduce erosion. In addition, buffers may be needed to prevent erosion and run-off from reaching surface waters.

Farrow-to-finish is the production system most commonly used by producers serving niche markets because the producer can control all stages from breeding the sows through marketing the finished hog. In some cases, the producer also manages processing the hogs and marketing the meat. This enterprise budget is based on the production and sale of finished hogs as live animals.

There are several uses for an enterprise budget. One use is by an existing producer to estimate costs and returns, for example, using data for a particular year. A second use is to make projections for the coming year, as an aid to decision making. A prospective producer might use a budget to explore new enterprises. An enterprise budget incorporates all the economic costs and returns attributable to the hog enterprise. Expenses include operating costs, the ownership or fixed costs associated with investments in the enterprise, the cost of hired labor and a charge for unpaid family labor. General farm overhead expenses and land charges are not included because these are whole farm costs.

This budget is based on a hog farming system believed to be fairly representative of what might be found under North Carolina conditions. Prices are based on recent history and expectations for the medium term future. It was created using Excel© and this version is available on-line at http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html. The various worksheets can be modified to generate costs and returns for an enterprise of a different size and type than the one in this budget or for different levels of animal performance and prices. However, anyone using the budget spreadsheet must accept responsibility for the information he generates and acts upon.

Marketing

Changing consumer tastes and preferences create niche market opportunities for many farmers, including hog producers. Segments of the consuming public are looking for food products with specific attributes. These include foods produced by particular production methods, such as, produced without antibiotics and added hormones, natural, free range, grass fed, raised humanely. Producers must comply with USDA certification regulations in order to label their foods “Organic”. If used on labels, some other terms such as grass fed and natural must be backed up by production methods that meet USDA definitions. Increasingly, consumers are seeking products that are locally produced or raised on a family farm, although these terms do not have a strict definition. Some consumers have preferences as to where they buy food, including direct purchases from farms, at farmers markets, in Community Supported Agriculture groups, in specialty retail stores, and in restaurants featuring these types of food products. Other features also add value to a purchasing experience including on-farm activities such as corn mazes and hay rides. Nevertheless, the traditional meat qualities of tenderness, juiciness, flavor, and leanness still matter, as does consistency of product from one purchase to the next.

Compared to farmers who supply traditional commodity markets, niche producers have some discretion over prices charged but consumers still show some price sensitivity and compare prices among competing products. Producers are strongly advised to do some market research and identify their target markets before developing their production systems. The needs and desires of these customers should influence the design of the hog production system, including overall volume of production, seasonality, the choice of breed, and target market weights. For direct marketers, meat cuts, product type, and package size and type are important also.

Production on Permanent Pasture

One basis for a sustainable pasture-based hog production system is one that produces hogs in a manner that minimizes environmental problems. Surface waters can be contaminated by soil, nutrients and organisms transported during rain events. Soluble nutrients can leach into ground water. These include nitrogen and potash. Phosphorus can also be soluble when present at very high levels in the soil. In a pasture-based system, maintaining pasture cover can increase water infiltration and reduce soil erosion and the associated surface water problems. Recommendations include limiting heavy use areas (bare ground) to a maximum of 15% of the total land area and maintaining a minimum of 75% pasture cover over the remaining area. Additional buffers are required to protect surface waters in most cases. However, even when vegetative cover is sufficient to minimize offsite movement, over a period of years there will be a buildup of phosphorus in the soil. Taking hay crops from the area will slow the rate of the build-up but at some point environmental considerations require the land used for hogs be taken out of production and either cropped to extract nutrients or converted to some extensive pasture-based livestock enterprise, such as cattle, managed in a way that will not add phosphorus.

The representative farm for this budget produces hogs on 24 acres of permanent pasture, subdivided into paddocks for groups of hogs at similar stages in the production cycle. Paddock size is calculated to 1) maintain pasture cover, 2) create a slow rate of phosphorus build up, and 3) distribute the nutrients produced by the hogs as evenly as possible between the sow and finishing hog areas. The system used as the basis for the budget assumes 24 sows, 2 Boars, 2 litters born per sow per year, 7 pigs weaned per litter, and a 3% death loss after weaning. The operation produces and sells 326 hogs per year at a weight of 250 pounds. To meet the year-round demands of the market, sows farrow year round in groups of four each month. Finishing hogs are grouped by age. The number and sizes of the paddock are calculated to maintain pasture cover throughout the year. There are six paddocks for sows and 12 paddocks for growing hogs. The growing hogs rotate through these 12 paddocks to allow rest periods for pasture regrowth or renovation.

Enterprise Investments

The infrastructure for the hog paddocks includes fencing and gates, watering points and feeders. These costs will be site specific and depend both on the farm layout and any existing infrastructure suitable for a hog operation. For the model farm used in the budget, fences are all electrified with three wires attached to T-posts, including perimeter and internal fencing. Each of the 18 paddocks has a watering point. Feeders and either natural or moveable artificial shade structures are provided in each of the paddocks when populated with hogs. Equipment needs likely include a tractor with implements, a pickup truck, and a livestock trailer. Some of these items may be shared with other farm enterprises. Perennial pastures are assumed to exist when the enterprise is first developed but because of damage caused by the hogs 20% of the land area is assumed to be replanted every year.

A final category of investment is the breeding livestock – sows and boars—which may be purchased or raised on the farm. The budget is based on 24 sows and 2 boars. Replacement gilts and boars are assumed to be purchased in order to simplify the budget. Sows are replaced every three years and boars every other year. Note that no land charges are included in the budget.

Production costs

There are three types of cost to consider; operating or variable costs of production, the ownership or fixed costs associated with the hog enterprise, and labor costs or charges including a charge for family labor. Feed costs are by far the largest component of operating costs. Other operating expenses include supplies and miscellaneous items, repairs and maintenance expenses associated with fencing, water systems, any other facilities, and machinery and equipment, sales expense, and the cost of working capital. Additional items may include pasture expenses and predator control, for example, keeping a dog (assumed to be unnecessary in this budget).

For the enterprise budget, feed requirements and costs were generated from a feed budget spreadsheet available on-line at http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html. The feed budget includes daily feed requirements for each type of livestock, days on feed, waste %, and unit cost of feed by animal category and calculates total feed amounts and cost. Other operating expenses listed in the budget include pasture renovation expense, supplies and miscellaneous items. Repair and maintenance expenses associated with fencing and water systems are estimated as a percentage of the new investment cost. These are itemized in Table 1 of the budget. If the initial investments are in used items with a lower initial cost to the farm then the annual repair and maintenance cost will be a larger percentage of the purchase price. Equipment operating expenses include repairs, maintenance and fuel cost. These are calculated in Table 2 of the budget. The cost of working capital is estimated at a 5.5% annual interest rate on the average operating expenses (that is, on one-half of the annual total). Sales expenses are assumed to be paid by the buyer.

Ownership costs are the annual charges necessary to recoup investments used by the hog enterprise. Cost categories are depreciation, interest on investment, property taxes, and insurance. These costs are summarized in three categories: Facilities, fencing, water; Machinery & equipment; and Livestock. These are itemized in Table 1 of the budget.

There is a cost assigned to all labor used by the hog enterprise, including both hired labor and a charge assigned to the value of family labor. Labor is separated into labor for operating machinery and equipment and livestock labor. The former is estimated in Table 2 of the budget. Livestock labor is associated with tasks not requiring equipment and any time spent while equipment is idle, such as, checking, moving and working with the hogs or repairing fences or facilities.

Revenue

Potential sources of revenue include sales of feeder pigs, finished (top) hogs, cull breeding stock,

and animals sold for breeding stock. The enterprise budget includes only sales of top hogs and cull breeding stock.

Net Returns

The budget includes three measures of net returns: Returns over Operating Expenses, Returns over Operating Expenses and Ownership Costs, and Returns over All Listed Expenses. Note that an enterprise budget only includes costs and returns that are specific to that enterprise and does not include general farm expenses such as land costs and farm overhead. For this reason, Returns over All Listed Expenses is also referred to as Returns to Land, Overhead, Management and Risk. However, note that these are only partial measures of profit. The preferred estimates of profit are returns on assets (investment), in dollar terms or as a rate of return, or returns to management. These measures are more appropriate to the financial performance of the whole farm. Additional measures of enterprise profitability include the margins or ratios of revenue compared to various expense categories.

Risk

Agriculture is inherently risky. Anyone making projections is advised to evaluate the robustness of their estimates by posing “what if” questions about the levels of animal performance, costs and returns. Table 3 of the enterprise budget provides a simplified assessment of risk by estimating the effect of 10% changes in costs and returns on the Return over All Listed Expenses.

Other Considerations

The economic viability of the whole farm business depends on more than the financial performance of one enterprise. By definition, an enterprise budget looks only at the specific investments, costs and returns attributable to that enterprise. Farm overhead costs and land related costs are not included. There may be complementary relationships with other enterprises, as noted above, for example, using crops to utilize nutrients from the hog enterprise.

There may be benefits to small landowners if running a farm enterprise allows the owner to qualify for lower property taxes under the North Carolina Agricultural Use Value rules. Qualifying to file taxes as a farmer instead of a non-farm individual may also confer tax advantages.

The whole farm must meet the family goals, including lifestyle, profitability, wealth and solvency, and cash flow. Environmental stewardship may be one of the family goals. For families with outside income and strong preferences to live on a particular small farm, the final decision may be one of choosing the farming option that best fits this lifestyle decision.

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Outdoor Hogs: Pastured Farrow-to-Finish. A template to estimate annual revenue, operating expense, fixed costs, and returns to land, overhead and management.

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24 sows and 2 boars managed on 24 acres of cool season perennial pastures. Land for hogs does not include land for buffers, sacrifice areas, farm lanes, or farm buildings.

Category	Description	Unit	Price/Unit	Quantity	Value	Comments
OPERATING INPUTS						
Perennial pasture	Renovation	Acre	\$100.00	4.8	\$480	
Perennial pasture		Acre	\$0.00	0.0	\$0	
Annual pasture or cover crop	e.g., winter annual	Acre	\$0.00	0.0	\$0	
Annual pasture or cover crop		Acre	\$0.00	0.0	\$0	
Sow Feed 1	Gestation	Cwt.	\$18.50	264.8	\$4,899	
Sow Feed 2	Lactation	Cwt.	\$18.50	275.9	\$5,104	
Sow Feed 3	Dry, open	Cwt.	\$18.50	54.6	\$1,010	
Creep feed		Cwt.	\$25.00	70.7	\$1,768	
Boar feed		Cwt.	\$18.50	46.1	\$853	
Growing hog feed		Cwt.	\$18.50	1029.2	\$19,040	
Finishing hog feed		Cwt.	\$18.50	1440.9	\$26,657	
Other feed		Cwt.	\$0.00	0.0	\$0	
Minerals	In feed	Head	\$0.00	0.0	\$0	
Vaccines, dewormers, meds		Head	\$2.50	352.0	\$880	
Vet services		Year	\$200.00	1.0	\$200	
Breeding stock	1 Boar, 8 gilts	Head	\$300.00	9.0	\$2,700	
Supplies	Bedding,	Head	\$20.00	24.0	\$480	
Other	E.g., Predator control	Head	\$0.00	0.0	\$0	
Miscellaneous	Per sow	Head	\$5.00	26.0	\$130	
Fence & Water Repair	% of initial investment	%	2.0%	\$19,875	\$398	
Facilities Repair	% of initial investment	%	2.0%	\$32,300	\$646	
Equipment operating	From Table 2				\$1,877	
Sales Comm. & transport	Buyer pays	Head	\$0.00	0.0	\$0	
Annual operating capital ^b	Interest rate, annual	\$	5.5%	\$28,319	\$1,558	
TOTAL OPERATING COSTS					\$68,678	
OWNERSHIP COSTS						
Facilities, fencing, water	Depreciation, interest, prop. tax, insurance				\$7,370	
Machine & equipment	Depreciation, interest, prop. tax, insurance				\$1,739	
Permanent pasture	Interest, prop. tax, insurance				\$0	
Livestock	Interest, prop. tax, insurance				\$276	
TOTAL OWNERSHIP COSTS					\$9,386	
LABOR COSTS						
Machinery operator labor, From Table 2					\$5,015	
Livestock labor	Work, check livestock	\$/hr.	\$10.00	365	\$3,650	
TOTAL LABOR COST					\$8,665	
TOTAL COST					\$86,729	
GROSS REVENUE^c						
Male feeder pigs	Note numbers, weight, etc	Head	\$75.00	0	\$0	
Female feeder pigs	" "	Head	\$75.00	0	\$0	
Finished male hogs	163 head at 250 lb/head, live		\$1.00	40,750	\$40,750	
Finished female hogs	" "	Head	\$1.00	40,750	\$40,750	
Cull sows	" "	Head	\$220.00	8	\$1,760	
Gilts for breeding stock	" "	Head	\$0.00	0	\$0	
Boars	" "	Head	\$220.00	1	\$220	
TOTAL REVENUE					\$83,480	
RETURNS OVER OPERATING EXPENSES					\$14,801.87	
RETURNS OVER OPERATING EXPENSES AND OWNERSHIP COSTS					\$5,416.13	
RETURNS OVER ALL LISTED EXPENSES^d					(\$3,248.87)	
RETURNS OVER ALL LISTED EXPENSES PER SOW				Average No. of Sows	24	-\$135.37
RETURNS OVER ALL LISTED EXPENSES PER ACRE				No. of Acres	24	-\$135.37

^a Annual operating costs can be actual costs or estimated using NCSU or other Forage Enterprise Budgets.

^b Interest calculated on one-half of operating input costs, except sales expense.

^c Revenues from sales of feeder pigs and cull breeding stock depend on numbers, pay weight at sale and price.

 Sale prices vary with type of market outlet, time of year, weight, frame, and fleshiness.

^d Returns to Land, Overhead, Management, and Risk

FARROW-TO-FINISH HOG ENTERPRISE ON PASTURE

Budget Sows-OSO5
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Table 1. Investment in specialized facilities & equipment and pro-rated share of annual ownership expenses

Category	Life	Initial Cost	Salvage Value	Depreciation ^a	Interest ^b	Tax & Ins. ^c	Total DITI	Share to Enterprise	Share to Enterprise
	Years	\$	\$	\$	\$	\$	\$	%	\$
Interest and Tax + Insurance Rates==>					5.00%	0.12%			
Facilities ^d :									
Sow huts	10	3,000	0	300	75	4	379	100.0%	379
General purpose bldg.	15	16,000	0	1,067	400	19	1,486	50.0%	743
Perimeter fence, gates	5	7,630	0	1,526	191	9	1,726	100.0%	1,726
Internal fence	5	2,890	0	578	72	3	654	100.0%	654
Water Supply	10	9,355	0	936	234	11	1,181	100.0%	1,181
Handling facilities	20	0	0	0	0	0	0	100.0%	0
Shade structures	10	7,800	0	780	195	9	984	100.0%	984
Feeders, Feed Storage	10	13,500	0	1,350	338	16	1,704	100.0%	1,704
Other facilities	1	0	0	0	0	0	0	0.0%	0
Feeding, pasture & livestock management:									
4-wheeler	10	12,500	3,250	925	394	15	1,334	20.0%	267
Tractor	20	19,000	4,940	703	599	23	1,324	25.0%	331
+ spinner seeder	10	2,300	598	170	72	3	245	10.0%	25
+ front end loader	10	3,000	780	222	95	4	320	10.0%	32
+ blade or harrow	10	600	156	44	19	1	64	25.0%	16
+ other tractor mounted	10	1,000	260	74	32	1	107	25.0%	27
Pickup	10	27,500	6,875	2,063	859	33	2,955	10.0%	295
+ stock trailer	10	7,000	1,820	518	221	8	747	100.0%	747
Other equipment	1	0	0	0	0	0	0	0.0%	0
Pasture establishment	5	0	0	0	0	0	0	100.0%	0
Pasture establishment	5	0	0	0	0	0	0	100.0%	0
Predator control animal	10	0	0	0	0	0	0	100.0%	0
Sows ^e	3	4,800	4,800	--	240	6	246	100.0%	246
Boars ^e	2	600	600	--	30	1	31	100.0%	31
TOTAL									9,386

^a Depreciation = (Initial cost - Salvage value) / years of life

^b Interest on average investment = ((Initial cost + Salvage value) / 2) X interest rate specified

^c Property taxes and insurance on facilities and equipment = Initial investment X tax + insurance rates specified.

^d Specialized hog facilities and equipment are movable to facilitate the subsequent cropping on the area used by the hogs.

^e Sows and boars are not depreciated. Cost of maintaining the herd are captured through replacement purchases and cull animal sales.

Table 2. Operating expense for machinery and equipment

Operation and Item	Horse Power	Repairs & Maint. ^a	Repairs & Maint.	Share to Enterprise	Est. Fuel Use	Fuel Cost	Fuel & Lube ^b	Hours of Use/Year	Total Op. Cost/Year	Labor Cost ^c	Total Expense
		%	\$/Year	\$	Gals/hr	\$/Hour	\$/Hour	Hours	\$	\$	\$
Fuel cost per gallon & Labor cost per hour ==>						3.75				10.00	
Feeding, pasture & livestock management:											
4-wheeler		2%	250.00	25.00	1.0	3.75	4.31	182.5	812.03	\$1,825.00	\$2,637.03
Tractor	35	2%	380.00	76.00	1.54	5.78	6.64	136.0	979.21	\$1,360.00	\$2,339.21
+ spinner seeder		1%	23.00	4.60	0	0.00	0.00	10.0	4.60		\$4.60
+ front end loader		2%	60.00	15.00	0	0.00	0.00	52.0	15.00		\$15.00
+ blade or harrow		1%	6.00	1.50	0	0.00	0.00	20.0	1.50		\$1.50
+ other tractor mounted		2%	20.00	2.00	0	0.00	0.00	52.0	2.00		\$2.00
Pickup		1%	275.00	27.50	2.5	9.38	0.00	183.0	27.50	\$1,830.00	\$1,857.50
+ stock trailer		2%	140.00	35.00	0	0.00	0.00	120.0	35.00		\$35.00
Other equipment		1%	0.00	0.00	0	0.00	0.00	0.0	0.00		\$0.00
TOTAL									1,877	5,015	6,892

^a Repairs and maintenance costs are calculated as a % of the initial cost in Table 1. Percentages are higher for equipment that is bought used.

^b Fuel cost plus lube costs estimated as 15% of the fuel cost.

^c Labor cost or charge includes an additional 15% allowance for inspection, equipment adjustments, cleaning up, travel, etc. Include labor that does not require equipment as "Livestock labor" directly in the budget, e.g, working cattle, moving fence, checking cattle.

Table 3. SENSITIVITY ANALYSIS

This table shows the net returns over all listed expenses (also called returns to land, overhead, management and risk) a measure of profit, under various assumptions about costs and returns. Specifically, the cost and returns shown in the enterprise budget on the first page are believed to be fairly representative of conditions in North Carolina. However, there is a wide variation in farm performance from one farm to another and costs and sale prices can change rapidly from year-to-year. The table shows the effects of returns that are 10 percent higher and lower than for the base budget. Similarly, the effects of total costs that are 10 percent higher and lower are shown also.

NET RETURNS ABOVE ALL LISTED EXPENSES (Returns to land, overhead, management and risk):

		REVENUE		
		-10% Lower	Base Budget	10% Higher
	-10%	-\$2,924	\$5,424	\$13,772
COST	Base	-\$11,597	-\$3,249	\$5,099
	+ 10%	-\$20,270	-\$11,922	-\$3,574